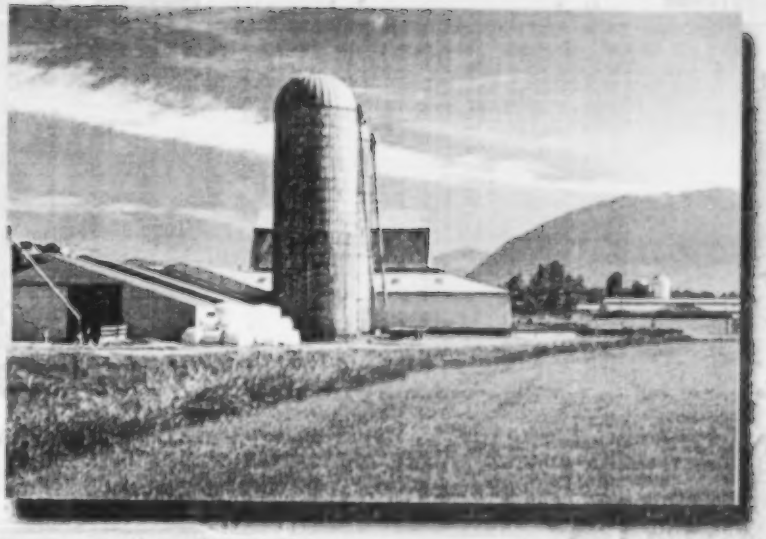
AgFocus

A Guide to Agricultural Land Use Inventory



BRITISH COLUMBIA
Ministry of Agriculture,
Food and Fisheries

National Library of Canada Cataloguing in Publication Data
Main entry under title:
AGFocus : a guide to agricultural land use inventory

ISBN 0-7726-4889-1

1. Land use, Rural - British Columbia. I. British Columbia. Ministry of Agriculture, Food and Fisheries.

HD319.B7A33 2002 333.76'11'09711
C2002-960262-9

Revised October 2004

Text may be reprinted without permission provided the B.C. Ministry of Agriculture, Food and Fisheries receives credit.

105-02818/

Contents

Introduction 1

Part I – Benefits of an Agricultural Land Use Inventory .. 4

Part II – Conducting an Agricultural Land Use Inventory 5

1. Identifying the survey area 6
2. Deciding what data to collect 6
3. Preparing for the survey 7
4. Conducting the survey 10
   - Staff 10
   - Time 11
   - Safety considerations 12
5. Recording the data 12
   - Tips on surveying 12
   - Using a laptop for data entry 13
   - Using maps for data entry 14

Part III – The Data Model 15

- The Parcel table 15
- The Activity table 16
- The Land Cover table 18
- The Data Entry Form 20
- Additions to the database - conducting inventory updates 22
- Additions to the database – recording alienated land 23
- Additions to the database – incorporating field boundaries 24

Part IV - Using the Data 25
Part V - Coding the Data 29
Land Use Activities 29
Agricultural Land Use Activities 30
Condition of Land Covers 31
Land Cover Codes 32
Appendix - Contacts 40

List of Figures

Figure 1 A laptop is a useful tool for recording land use data 5
Figure 2 Aerial photography is a valuable source of information 9
Figure 3 Sample data entry form in MS Access 21
Figure 4 Smart Info query tool 25
Figure 5 The Land Cover query tool 26
Figure 6 Maps can be produced with a GIS 27

List of Tables

Table III-I Scale of the livestock operation 18
Table IV-I Maps and statistics that can be generated 28
Table V-I Land use activities on data entry form 29
Table V-II Agricultural land use activities to be entered 30
Table V-III Descriptive comments about state/condition of land cover 31
Table V-IV Land Cover codes 33
Table V-V Agricultural Practice codes 38
Table V-VI Livestock codes 39

Introduction

Agriculture is a cornerstone activity important to the health and well being of British Columbians. Since the early days of the province, farming and farm families have played an important role in many BC communities. Land used for agriculture can account for a large part of many local jurisdictions, and has significant relationships with the environment, urban development, transportation and other resource uses. The agri-food sector that has evolved today makes significant economic, environmental and social contributions. Despite the importance of farming and ranching, fewer and fewer people have a direct link with agriculture. This has resulted in the gradual erosion of a first-hand understanding of agriculture, its various land use relationships and the issues associated with operating a farm or ranch.

In an effort to improve links between local governments, provincial agencies and the farm community, the Ministry of Agriculture, Food and Fisheries introduced the Strengthening Farming Program. This program has initiated several projects to improve these linkages and foster agricultural awareness. A key project that was successfully completed under the Strengthening Farming Program was the Pitt Meadows GIS pilot project.

The pilot project was undertaken in partnership with the District of Pitt Meadows to explore the benefits of adding agricultural data and tools to a Geographic Information

System (GIS). The results are outlined in the report *AgFocus - An Agricultural GIS*[1]. The report highlights the use of GIS in farming areas to provide a broader understanding of agriculture, promote local agriculture and assist with land use decision making processes. A key component of the system was incorporating land use inventory data into the GIS. Since the completion of the pilot project, MAFF has worked with several other local governments, to conduct agricultural land use inventories and incorporate the data into their GIS.

This document, *AgFocus - A Guide to Agricultural Land Use Inventory*, looks at the benefits of an agricultural inventory and considers a range of practical topics associated with conducting an inventory. It is a companion document to the GIS report and is **meant to serve as a guide for communities interested in undertaking an inventory of their agricultural land base**. The guide includes procedures for conducting an agricultural land use inventory, a suggested data model focusing on land use activities and land covers, and a coding system which allows for varying levels of detail.

AgFocus – A Guide to Agricultural Land Use Inventory is intended to build on the Strengthening Farming Program's commitment to ensure strong working relationships between the Province, local governments and the agri-food industry. The Ministry of Agriculture, Food and Fisheries looks forward to working with municipalities, regional districts and other agencies interested in pursuing land use inventory work in their farming and ranching areas and developing an agricultural GIS.

[1] The AgFocus - An Agricultural GIS report and summary brochure can be found on the B.C. Ministry of Agriculture, Food and Fisheries web site, http://www.gov.bc.ca/agf/ under 'Reports & Publications' / Resource Management.

Part I – Benefits of an Agricultural Land Use Inventory

Effective land use planning requires a comprehensive understanding of a variety of elements, including the spatial patterns of the area under study. Many agencies in British Columbia are finding that Geographic Information Systems (GIS), in combination with land use inventory data, is a useful tool in helping to understand, analyze and display these spatial patterns.

An agriculture land use inventory can serve several purposes, such as:

- provide a record of land uses in farming or ranching areas and act as a benchmark for monitoring land use change;
- improve the understanding of land use and resource relationships;
- identify impacts of proposed policies and regulations;
- improve the information base to assist land use decision-making including official community plan and bylaw updates;
- help identify challenges and opportunities to enhance agriculture; and
- identify opportunities for greater land use and resource compatibility.

By incorporating agricultural land use data into a GIS, people can enhance their knowledge of farming areas and be better prepared to plan for and promote agriculture.

Part I – Benefits of an Agricultural Land Use Inventory

Effective land use planning requires a comprehensive understanding of a variety of elements, including the spatial patterns of the area under study. Many agencies in British Columbia are finding that Geographic Information Systems (GIS), in combination with land use inventory data, is a useful tool in helping to understand, analyze and display these spatial patterns.

An agriculture land use inventory can serve several purposes, such as:

- provide a record of land uses in farming or ranching areas and act as a benchmark for monitoring land use change;
- improve the understanding of land use and resource relationships;
- identify impacts of proposed policies and regulations;
- improve the information base to assist land use decision-making including official community plan and bylaw updates;
- help identify challenges and opportunities to enhance agriculture; and
- identify opportunities for greater land use and resource compatibility.

By incorporating agricultural land use data into a GIS, people can enhance their knowledge of farming areas and be better prepared to plan for and promote agriculture.

Part II – Conducting an Agricultural Land Use Inventory

While there are a number of ways to acquire land use information, the method developed by MAFF involves a team of two surveyors conducting a "windshield" survey. Using a combination of drive-by observations and aerial photographic interpretation, the survey team examines each legal parcel in the study area, recording both the land covers and the land use activities. Examples of land covers include buildings, crops and vegetated areas, while land use activities include such categories as agricultural, residential and industrial use. The information is coded into data tables in a computer, which are then linked to a GIS layer of the survey area's legal parcels. A GIS user can then query and map the land use inventory information.

The basic steps to collecting an inventory are:

1. Identifying the survey area
2. Deciding what data to collect
3. Preparing for the survey
4. Conducting the survey
5. Recording the data

Figure 1 A laptop is a useful tool for recording land use data during the survey.

1. Identifying the survey area

The survey may encompass a subset of the farming community where a specific need exists for information, or it may cover all land in the municipality's ALR if a broad information base is needed. When surveying the entire ALR area, it is a good idea to also include land along the urban side of the ALR boundary. Having information about land use on either side of the ALR boundary will be particularly important if more focussed "edge" planning to promote land use compatibility is anticipated. In addition, if farming areas exist outside of a municipality's ALR lands, these areas should be considered for surveying as well.

2. Deciding what data to collect

Before collecting any data, it is important to identify what information is needed and how it is going to be used. People who might be working with the data in the future should be consulted as to whether there's anything they wish the surveyor to pay particular attention to. For example, people dealing with water and drainage issues may have different needs and interests than those charged with bylaw enforcement or updating an official community plan.

Other factors to consider are the size of the study area and the scale at which the data is likely to be displayed. For a small survey area, it might be feasible to record a great deal of detail about the landscape. For a large area, it might be practical to only record major land use activities. While collecting the most detailed level of information gives the most comprehensive data, there might not be the time, expertise, or need for it.

3. Preparing for the survey

The following is a list of the elements needed to conduct a survey.

- Vehicle
- Survey maps
- Street map for navigation
- Laptop computer (if available)
- Adapter for powering laptop from the vehicle
- List of land use codes for recording data (see Part V)
- Any existing data about parcels

When conducting the survey, maps are used to identify properties and features. If a laptop computer is not available for data entry, maps can also be used for recording data. If this is the case, large scale survey maps such as 1:2500 are desirable so there is room to record data on them. If the maps are not used to record information on, a scale of about 1:5000 will suffice. Ideally, the survey maps should include:

- the legal parcel boundaries
- unique identifiers for each legal parcel
- the ALR boundary
- base features such as streets, street names, watercourses and contours
- aerial photography

The survey data is recorded on a parcel by parcel basis, thus it is necessary to have a GIS layer of the survey area's legal parcels, or cadastre. It is essential that a unique identifier exist for each parcel, as it is used to link the land use data to the GIS cadastral coverage. Many local governments use the BC Assessment roll number to identify parcels, but this value can be problematic because sometimes two or more parcels can have the same roll number. If the local government has some other value to uniquely identify a parcel then this can be used instead.

In addition to the parcel identifiers, a GIS department may already have other information about parcels. If data such as property addresses, ownership, BC Assessment Farmland classification and actual use code, inclusion in the ALR, zoning, or data from previous inventories is available, it is useful to have it on hand during the survey. This information will help the surveyors to better locate properties as well as understand land use and land use changes.

Aerial photography provides a valuable source of information for the survey maps. Without aerial photography, it is difficult to tell which buildings are on which parcels, or to estimate the area of a crop. The photography also helps to identify crops and structures which are not easily seen from the road if, for example, shrubs or trees are blocking the view. The cost of digital aerial photography will vary depending on its age and resolution.

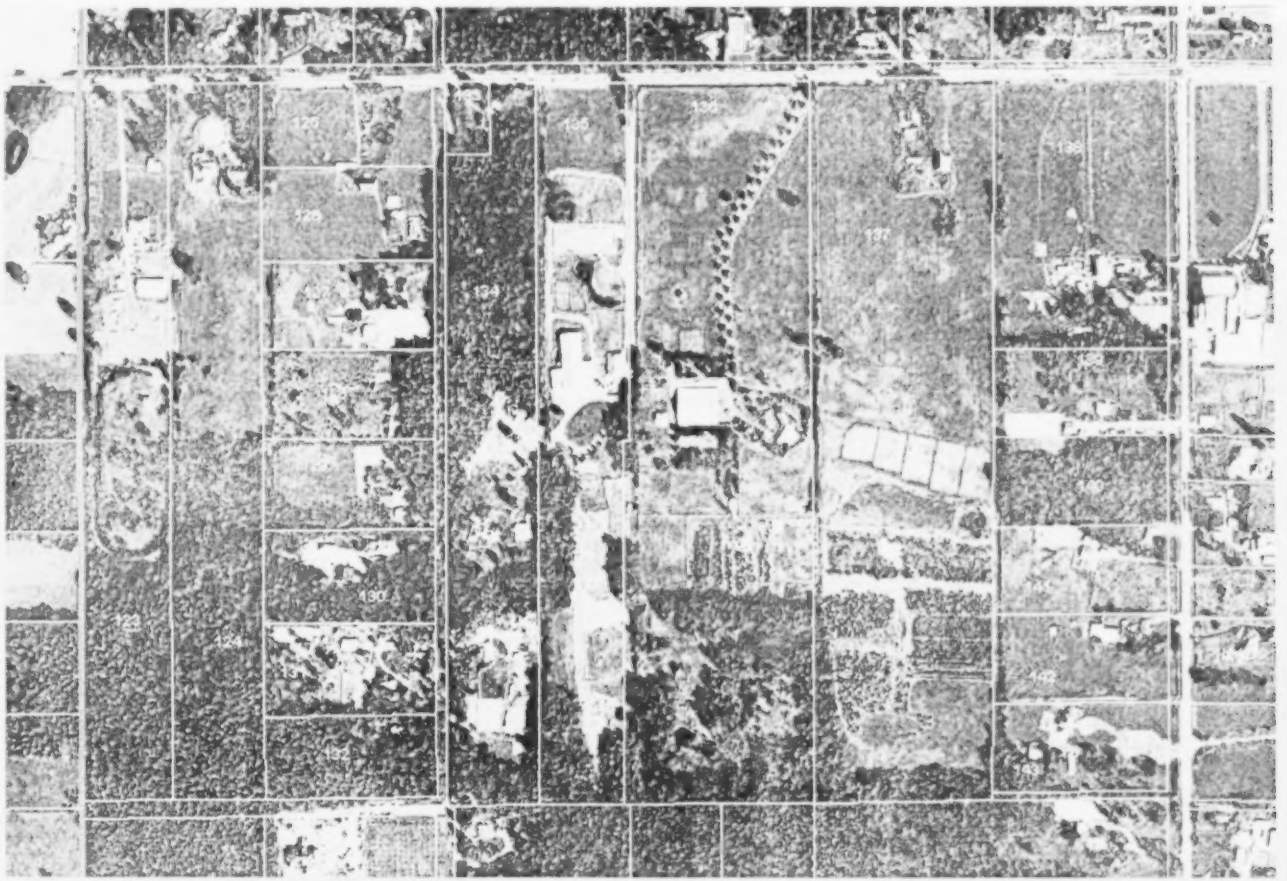


Figure 2 Aerial photography is a valuable source of information during land use inventory mapping.

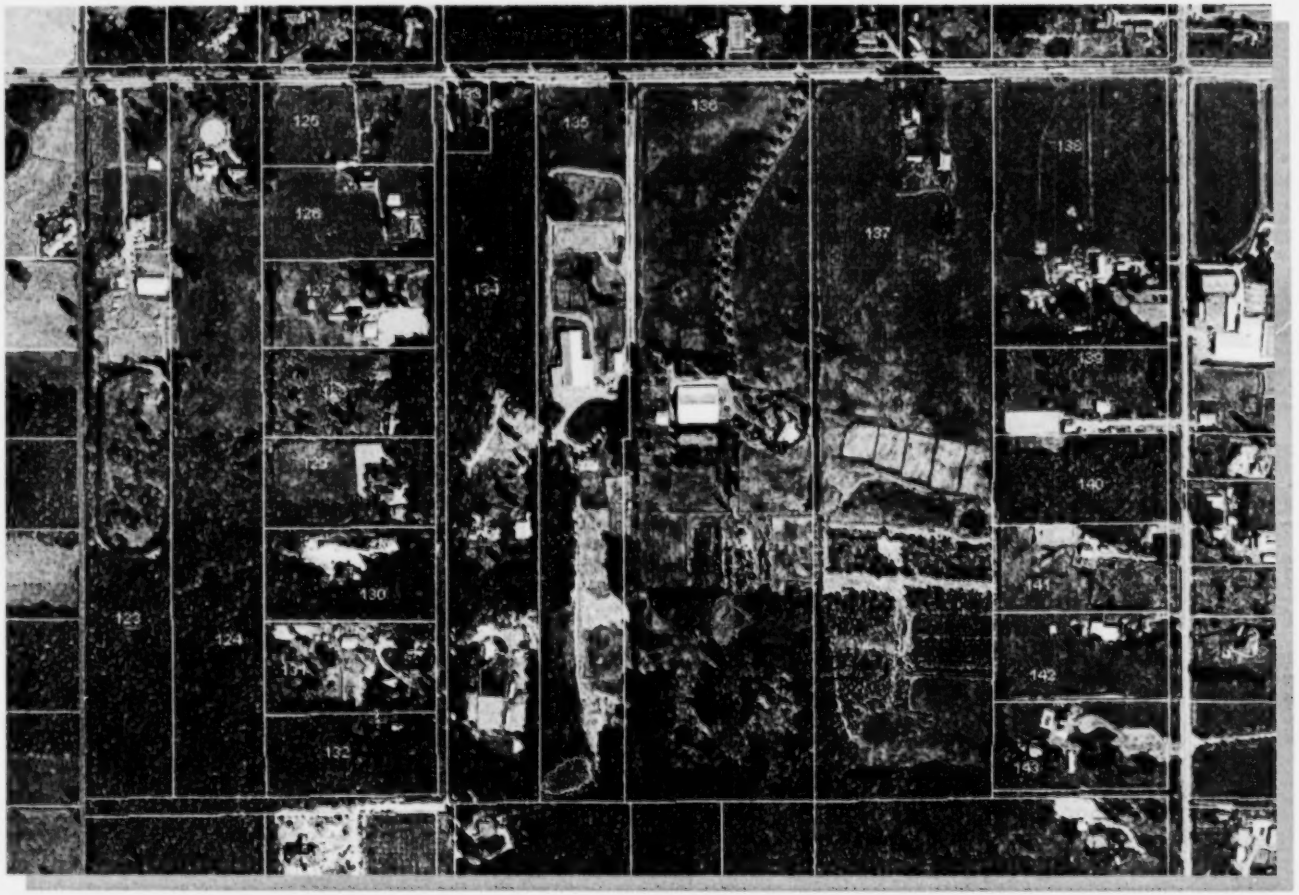


Figure 2 Aerial photography is a valuable source of information during land use inventory mapping.

4. Conducting the survey

Staff

The survey can usually be conducted by two people. One person drives and the other navigates and records land use information. The recorder directs the driver to the next property, then both surveyors look over the property to determine its land covers and land use activities. The recorder notes this information, ideally directly into a laptop computer. For safety reasons it may be useful to have a third surveyor present on difficult roads such as those with a high traffic volume, so that the driver can focus solely on the traffic.

It is critical that at least one of the surveyors have a strong understanding of the agricultural activities and crops which are common in the study area, to serve as the "agricultural eyes" of the survey team. It is recommended that this person be present throughout the entire survey, to ensure consistency in how data is recorded. Besides familiarity with agriculture, other essential skills for the survey team include interpreting maps and aerial photography. If using a laptop, the data recorder should be computer literate and familiar with the data entry tool.

Agricultural expertise may be found within the community itself by way of a retired farmer or rancher or member of a local Agricultural Advisory Committee. An agrologist, with a good general grounding in agriculture, is another option. Where an agricultural land use inventory is undertaken by a munici-

pality or regional district, it is advantageous if at least one of the survey team is drawn from the local government's planning, GIS, or mapping department staff. This will ensure a local staff person is aware of the details of how the survey was conducted in order to respond to any questions regarding data collection and interpretation.

The Resource Management Branch staff of the Ministry of Agriculture, Food and Fisheries will assist local governments in implementing an agricultural land use survey to the greatest extent possible. This may include providing the electronic data entry form (created in MS Access) and other 'start-up' assistance. Resource Management Branch staff may also be able to join the survey team for a day or two at the beginning of the survey if further assistance is required. Local district or regional agrologists of the Ministry may be able to assist the survey team in answering any particular questions about agricultural land uses that may arise during the course of the survey.

Time

On average, surveying can be done at a rate of about 1000 hectares per day. Surveying may be slower than this in an area with small parcels and complex land uses. The rate of surveying will also vary depending on traffic, weather, the experience of the surveyors and the level of detail being recorded. If the data is recorded manually rather than into a laptop, several days or even weeks will be needed for data entry back at the office. If a laptop is used, data entry is done during the survey, but several days will still be needed to check over the data and fix any errors.

Safety considerations

Conducting a survey requires driving slowly and stopping often, while maintaining a high level of focus on the landscape being surveyed. The following safety considerations will help in dealing with traffic:

- Use a clearly marked government vehicle.
- When stopping frequently, turn on hazard lights to alert other drivers.
- Be aware of which roads have a high volume of traffic, and plan to avoid these routes during rush hours. The least busy time of day is usually in the late morning.
- Be aware of which roads have a wide shoulder or parking lane for stopping, so that roads without a shoulder or parking lane can be avoided during rush hours.

5. Recording the data

Tips on surveying

- Be consistent in how you record information, such as observing land covers in a certain order each time. This makes it less likely to skip things. For example, you may wish to record information in the following order:
  - crops, eg. berries, pastures
  - agricultural structures, eg. barns, paddocks
  - livestock types associated with the pastures or structures
  - agricultural practices associated with crops or structures

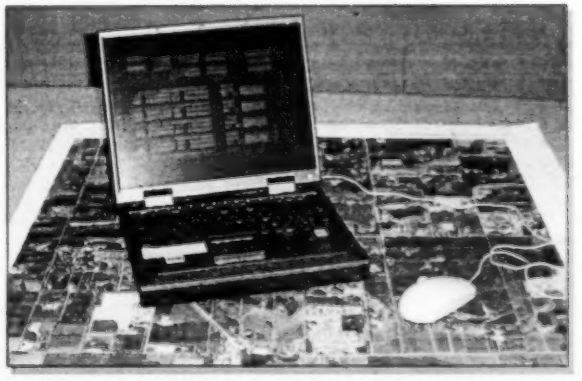
- non-agricultural structures and land covers, e.g. residences, treed areas
- land use activities

- Even if no livestock is visible from the road, sometimes livestock can be identified by other clues, e.g. whether a pasture has been recently grazed, the type of fencing or barns, or the presence of a horse trailer in the driveway.
- Look for signs on the road or at the farm entrance for clues about the property. Signs may indicate the farm name or the types of commodities produced, e.g. "Farm Fresh Eggs" or "U-Pick Raspberries".

- Use the aerial photography to identify structures that can't be seen from the road.
- Be prepared for questions from residents. It is a good idea to have an information plan to inform people of what you are doing; carry business cards to give out, put an article about the survey in the local paper, and have contact names that people can call with questions.

Using a laptop for data entry

During the survey, land use data can be recorded directly into a laptop, drawing power from the vehicle. If a laptop is used, the recorder should still make notes on the survey map when necessary. For example, on a large parcel with several different types of crops, the recorder should note on the map which crops are being grown on which sections of the parcel.



USING MAPS FOR DATA ENTRY

If a laptop is not available, the surveyors' observations should be recorded directly onto the survey maps. The land covers can be recorded on the map in words or in codes, depending on the recorder's preference. If recording data directly onto a map, observe the following tips:

- Determine beforehand what colour pen shows up best on the map and have several on hand.
- Write neatly and clearly.
- The person who recorded the data during the survey should be the same one to transfer the data into the computer. Data entry should be done soon after the survey is conducted when the details are still fresh in the surveyor's mind.

Part III – The Data Model

Land use information can be recorded in many different ways. The following methodology has been developed over time based on MAFF's experience with various land use inventories. A database has been developed in MS Access which can be used to enter and store the information collected via this methodology. This database can be provided to interested parties, although some customization may be required to make it suit an area's needs. The following section discusses the three main tables which exist in the database and the fields within those tables.

The Parcel table

The Parcel table contains existing information about the parcels. This table is essentially the polygon attribute table of a municipality's GIS cadastral coverage, containing information such as the unique identifier (i.e. Parcel ID), the street address, BC Assessment information, etc..

The Parcel ID is used to link all three data tables together. It is also used to link the land use inventory data to a GIS layer of the survey area's cadastre so that the survey data can be mapped.

Existing parcel information should be present in the database before the survey commences. In addition, blank fields are added to this table, to be filled in during the survey. These fields include:

- **Farm name** – Farm name (or business name, if a store or other commercial operation exists)
- **Comments** – Surveyor comments about the parcel as a whole, e.g. if the property has a "For Sale" sign

- **Confidence** – the recorder's confidence level about the data for that property. For example, possible values could include "Some features hidden by trees", "Livestock type inferred, not seen", "Suspect that livestock were missed" or "Very confident can see all of property".
- **Change** – Land use change since the last survey, if a previous survey was conducted. Here the recorder can note such things as "pasture converted to blueberries". After the survey is complete, the recorder may wish to group this information into a small number of categories. This field allows a map of land use change to be created.

The Activity table

The second data table contains information about land use activities. The Activity table has a one-to-one relationship with the Parcel table; i.e. for each parcel in the Parcel table, only one record exists in the Activity table. The tables are linked together by the Parcel ID.

The fields in the Activity table are as follows:

- **Parcel ID** – The unique identifier for the parcel
- **Primary activity** – The primary land use activity taking place on the parcel. This is a general description, such as "Agriculture", "Residential" or "Commercial/Service". A detailed list of land use activities with definitions/examples is found in Table V-I on Page 29. The list can be modified to suit a particular survey area.

- **Secondary activity** – The secondary land use activity
- **Tertiary activity** – The tertiary land use activity
- **Primary agricultural activity** – The primary agricultural land use activity occurring on a parcel, such as "Beef Cattle Farm", or "Greenhouse Operation". This value is only filled in if "Agriculture" is listed as a primary, secondary or tertiary activity. The primary agricultural activity is the one which is likely the greatest source of income. It is recognized that in some cases this may be difficult to determine, so the distinction between primary, secondary, tertiary and quaternary agricultural activity is at times a best guess.

  A detailed list of suggested activities to be entered in the primary, secondary, tertiary or quaternary agricultural activity fields is found in Table V-II on page 30. The list can be modified to suit the needs of an individual project area.

- **Primary agricultural activity scale** – An estimate of the size or scale of the agricultural operation. It is generally used to describe livestock operations. The value is an estimate of the number of livestock present, based on the number observed and from the size of barns, pastures and other livestock-related facilities. The criteria that has been used for the Lower Mainland is listed in Table III-I below. The table can be modified to address other areas of the province where much larger operations exist. This field could also be used to describe the scale of other types of operations, such as greenhouses or berry farms.

Table III-I **Scale of the livestock operation based on the estimated number of livestock present. Values may differ for areas outside the Lower Mainland.**

	Small	Medium	Large
Horses	1-4	5-10	11+
Beef cattle, sheep, goats, llamas	1-10	11-50	51+
Dairy cattle	1-50	51-100	101+

- **Secondary agricultural activity** – The agricultural land use activity which is of secondary importance, in terms of income generation.
- **Secondary agricultural activity scale** – The scale of the secondary agricultural activity. This uses the criteria from Table III-I, as do the tertiary and quaternary agricultural activity scales.
- **Tertiary agricultural activity** – The agricultural land use activity which is of tertiary importance, in terms of income generation.
- **Tertiary agricultural activity scale** – The scale of the tertiary agricultural activity.
- **Quaternary agricultural activity** – The agricultural land use activity which is of quaternary importance, in terms of income generation.
- **Quaternary agricultural activity scale** – The scale of the quaternary agricultural activity.

The Land Cover table

The third data table contains information about land covers. Land covers include, for example, buildings, crops, and natural features, such as watercourses or trees, – anything that covers the land. The Land Cover table has a one-to-many relationship with the Parcel table; i.e. for each parcel in the Par-

cel table, many records may exist in the Land Cover table. The tables are linked together by the Parcel ID.

The fields in the Land Cover table are as follows:

- **Parcel ID** – The unique identifier for the parcel
- **Land Cover code** – This code describes the land cover, e.g. buildings, farm structures, natural features or crops, and is entered in the Cover field. Six major categories of land covers have been defined in the coding system: Agriculture (AL), Mineral extraction (M), Recreation (R), Settlement (S), Vegetated areas (V) and Water Management areas (WM). The coding system is hierarchical, allowing different levels of detail to be recorded and displayed. An extensive list of land cover codes is found in Table V-IV starting on page 33.
- **Agricultural Practice code (AP)** – This code describes the agricultural practice taking place on a land cover, if any, and is entered in the Practice field. Some examples of agricultural practices include irrigation or crop protection. A detailed list of agricultural practice codes is found in Table V-V on Page 38.
- **Livestock code (AP8)** – This code describes the type of livestock associated with land covers such as barns, paddocks and pastures. More than one type of livestock can be recorded if necessary, i.e. if both sheep and cows are grazing in a pasture. A detailed list of livestock codes is found in Table V-VI on Page 39.
- **Percent of parcel** – This is an approximation of how much of the parcel is occupied by a particular land cover, e.g. a blueberry field occupying 70% of the farm. This value gives a rough idea of the area of the land cover and is most easily determined from aerial photography. Care should be taken to ensure that the total for all land covers on a parcel does not exceed 100%.

- **Count** – This is the total number of a certain land cover where more than one exist, e.g. where there are several houses or beef barns on a farm.
- **Condition** – This is a descriptive comment about the condition of a land cover, e.g. abandoned, inactive, new or under construction. Definitions are found in Table V-III on page 31. More than one condition can be recorded if necessary.
- **Obtained by airphoto** – This is a Yes/No field, which is set to "Yes" when the land cover has been identified by airphoto alone, because the view from the road was obscured. This indicates to those interpreting the data that there is some doubt about the accuracy of the land cover, as it was not visually confirmed.
- **Comments** – Any additional comments the surveyors may have regarding a land cover.

The Data Entry Form

When using the data entry form developed by MAFF as part of its land use database, the recorder enters the unique identifier for a parcel, in order to access the information for that parcel. The recorder can then enter the data describing the parcel's land use. The data entry form displays information from the three different data tables. Information from the Activity table and the Cover table is displayed in the two "sub-forms" on the main form. When entering a land cover Code (e.g. AL141) into the data entry form, the code's description fills in automatically (e.g. "Improved pasture"). This helps ensure against errors when typing in codes. A small triangle to the right of a field indicates a pull-down menu, where the recorder can select the appropriate code from a list.

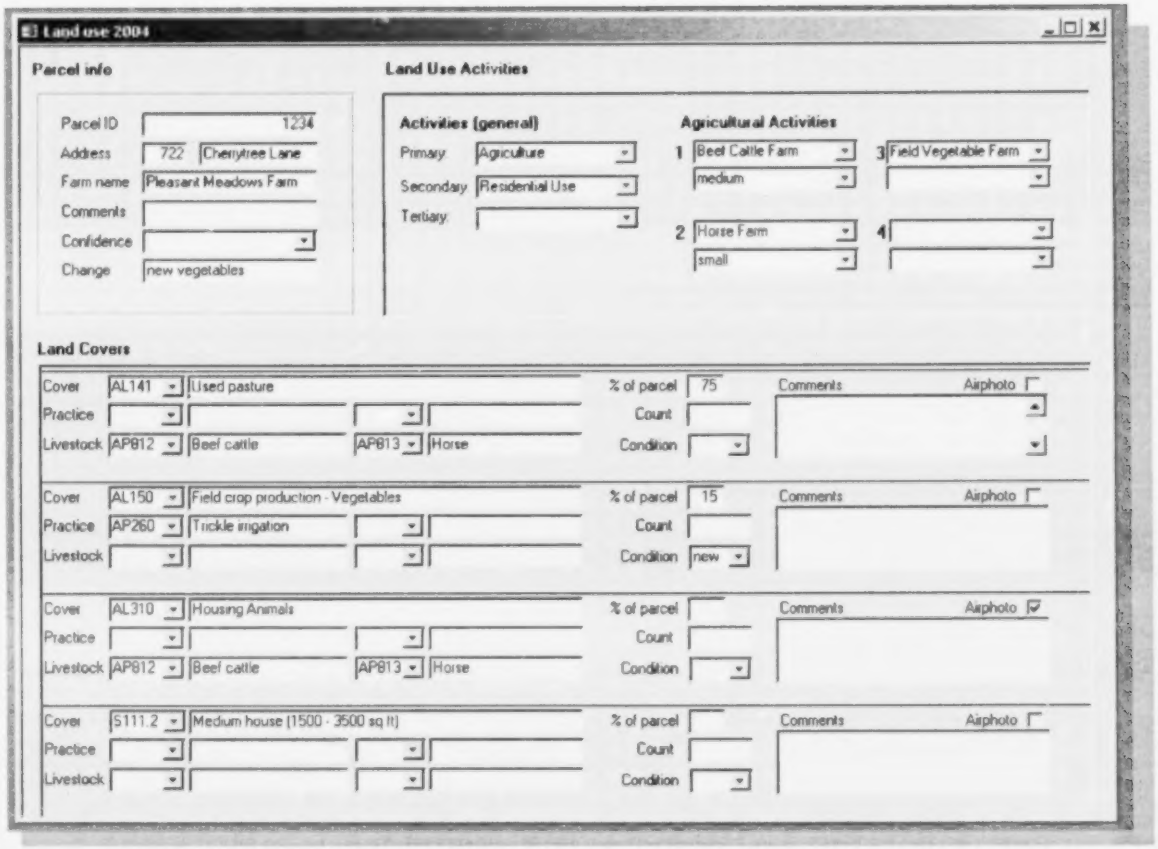


Figure 3 Sample data entry form in MS Access, displaying information from the Parcel, Activity and Cover tables.

Additions to the database – conducting inventory updates

The database can be altered to accommodate different needs. The form can be used when conducting an inventory update, if a previous inventory of the survey area has already been conducted. A button is added to the form, which when selected will copy the previous survey's data onto the new form for a particular parcel. Updates can then be quickly made to that parcel's land use data when re-surveying. By updating the previous information rather than starting data entry from scratch, consistency is maintained between surveys. After updating the information, the recorder can then fill in the "Change" field in the Parcel table, if a major land use change has occurred. Although changes in land use can be determined from the data by comparing data from different years, this field is useful because the surveyor can use their own discretion in determining whether significant land use change has occurred or not. For example, the surveyor may decide that changing from "Forage Operation" to "Pasture" is not significant enough to be considered a land use change. The Change field also allows a map of land use change to be easily generated using GIS.

Additions to the database – recording alienated land

Some surveyors are interested in recording the amount of the landscape which has been *alienated* from agricultural use. Alienated land is defined as farmable land within the ALR that cannot be used for agricultural purposes because of a conflicting land use activity. To accommodate this, a field can be added to the Activities table called "Alienated". This is a boolean field, meaning it only accepts "Yes" or "No" as a value.

On the data entry form, the recorder can place a tick in a checkbox for parcels considered alienated. Default values can be set prior to conducting the survey, i.e. the checkbox would automatically be ticked if the following values are entered as the parcel's Primary Activity: Commercial/Service Use, Cultural/ Entertainment, Golf Course, Industrial Use, Institutional Use, Military Area, Mobile Home Park, Park, Recreational Use, Residential Use, Residential Use – Multi-family, Storage Yard, Transportation and Communications, or Wildlife Area. Definitions and examples of these activities can be found in Table V-I on Page 29. Agriculture related activities including "Agriculture, Freshwater aquaculture, and Unused farmland" by definition cannot be considered alienated.

Additions to the database - incorporating field boundaries

Another adaptation of the data entry method is incorporating field crop boundaries. This method was piloted in the Regional District of Comox-Strathcona where agricultural field boundaries were provided by Ducks Unlimited, one of the partners in the data collection project. In this method, field boundaries are digitized from orthophotography, using relatively permanent physical boundaries such as forests, ditches, roads and buildings. Each field is given a unique identifier. The field boundary GIS coverage is unioned with the cadastre coverage, in order to calculate the area and percentage of each parcel which is inside the fields. After the coverages are unioned, sliver polygons are deleted, e.g. any polygon which is less than 4% of a parcel and less than 0.1 hectares in size.

A fourth data table, the Crops table, is then added to the MS Access database, with the same data fields as the Cover table. A form is also added, so that data can be entered into this Crops table on a field by field basis. The surveyor has both forms open during the survey, so that information can be entered for parcels and for fields. The data about a field need only be entered once, even if the field extends over several different parcels. The field information and percent of parcel will automatically be filled in for all the parcels the field intersects.

Using the regular land use inventory method, only parcels containing a certain crop type can be pinpointed using GIS, rather than the exact locations of that crop type. By integrating field boundaries into the methodology, exact locations of crops can be shown on a map and more accurate acreages of land devoted to crops can be calculated.

The data tables are populated during the survey through the data entry form. The tables can then be used in a GIS either by connecting directly to the MS Access database or by importing the tables. Using ArcView 3, MAFF has designed special tools which will join or link the various data tables to the GIS cadastre layer using the Parcel ID as the unique identifier. These tools (Smart Info and Land Cover query) allow users to easily run queries. MAFF has also prepared detailed instructions for using the data in ArcGIS 8 (e.g. setting up joins and relates between tables) which are available upon request.

An individual parcel in the cadastral GIS layer can be queried to obtain its land use inventory information. The **Smart Info query tool** is used to select a specific parcel and retrieve a listing of its land covers or land use activities.

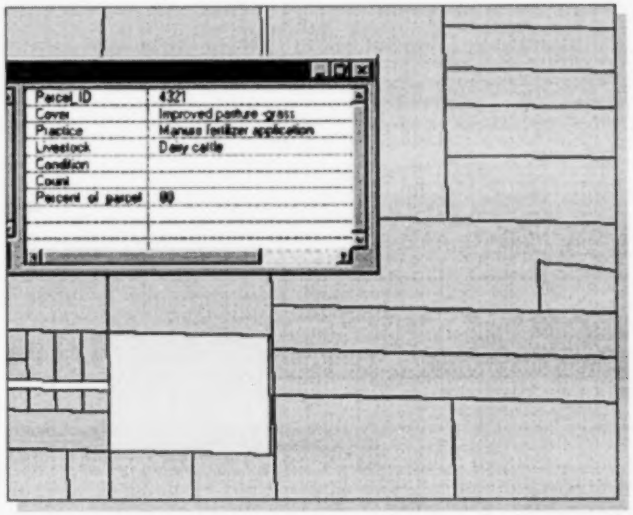


Figure 4 Smart Info query tool can retrieve land cover or land use activities assocaited with a specific parcel.

The data can also be examined at a local government or sub-area scale to identify which parcels contain a specific land cover or land use activity. Since the land cover coding is hierarchical, different levels of detail can be displayed. For example, a map can be created showing all parcels producing "Berries" (whether the primary use or not), or a more specific map identifying "Cranberries". The **Land Cover query tool** provides the user with a list of land covers to select from, and then generates a new GIS layer of parcels which contains the specified land cover (Figure 5). Maps can also be created showing livestock (e.g. dairy cattle) or agricultural practices (e.g. parcels with netting over crops).

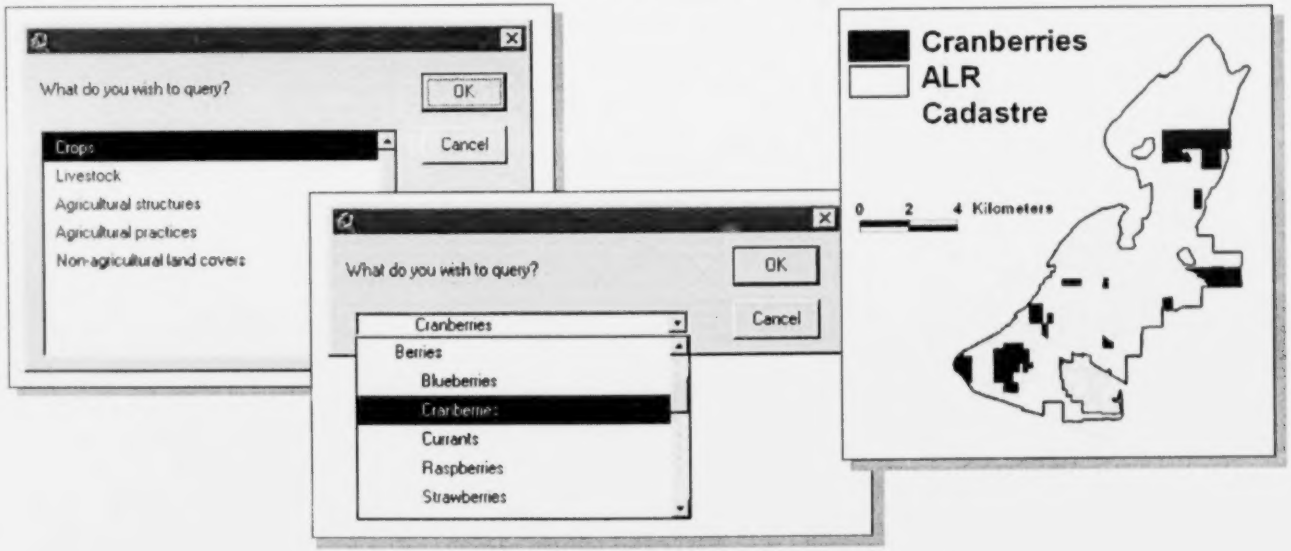


Figure 5 The Land Cover query tool can be used to identify and map specific land covers, such as cranberries.

In addition to mapping specific land covers, overview maps can be generated which summarize land use activities for the study area. Using the data from the Activity table, a colour-coded map can be produced to show a particular field, for example primary agricultural activities (Figure 6).

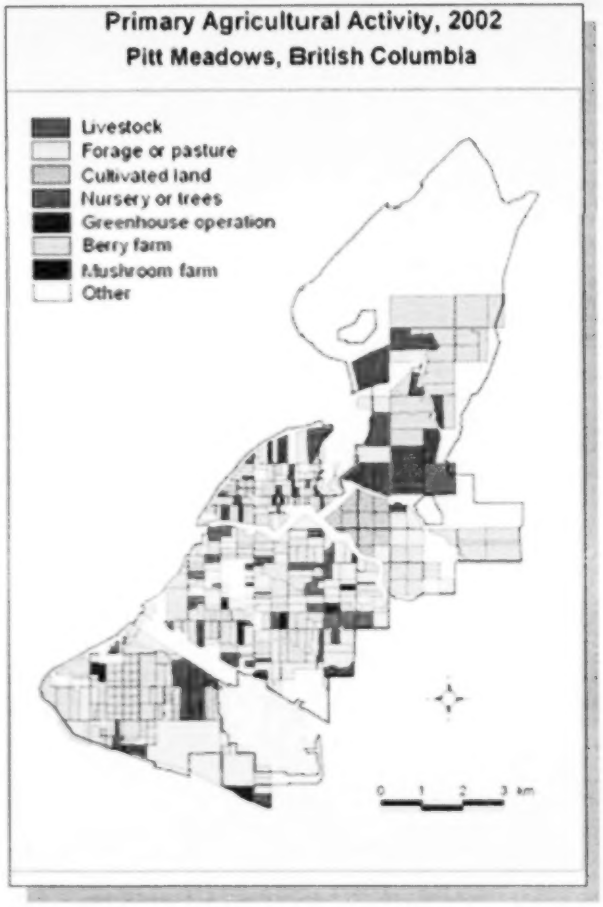


Figure 6 Maps can be produced with a GIS to identify general or specific land use activities.

Other GIS layers (e.g. aerial photography, streams, ALR boundary, etc.) can be incorporated with the new land use data to create detailed maps. The following table (Table IV-I) lists various maps and statistics that can be generated from the land use data.

Table IV-I **Maps and statistics that can be generated from the land use inventory**

Maps and Statistics	Examples
Land use activities in the ALR	Primary land use activities
Agricultural landscape in the ALR	Primary agricultural activities grouped into categories such as: livestock operations, field vegetables & flowers, forage & pasture operations, berry & vine crops, greenhouse operations, nursery and tree farms, cultivated or fallow land, mushroom farms
Non-agricultural uses in the ALR	Unused farmland, parcels alienated from agriculture
Changes to Agriculture	Parcels no longer in agricultural use, parcels with new agricultural use, commodities that have increased since the previous survey
Dwellings in the ALR	Parcels with large houses, net change in number of dwellings per parcels since the previous survey
Activities on the urban-rural edge	Primary land use activities on the urban-rural edge, agricultural activities on the urban rural edge
Water Usage in ALR	Irrigated and non-irrigated farmland, type of irrigation systems

A disadvantage of this data model is that no single map can be produced that summarizes the entire agricultural landscape. For example, a farm with "beef cattle" as its primary agricultural activity and "greenhouse operation" as its secondary agricultural activity cannot easily have both activities displayed on the same map. Similarly, a farm with both field vegetables and strawberries as land covers cannot easily have both crops displayed.

An alternative data model is to summarize all the land use activities in a single description. While this allows for producing a single overview map of land use, it lacks detail. In an area where farm uses are complex and varied, most of the properties will be classified as "mixed use", which is not as informative.

For more information on land use data in GIS, see the report *AgFocus – An Agricultural GIS* prepared by MAFF.

Part V – Coding the Data

Several fields on the data entry form are selected from pull-down lists. This section describes the values in the pull-down lists.

Land Use Activities

Table V-I below outlines the land use activities which can be entered under the Primary, Secondary, or Tertiary Activity fields on the data entry form. Items may be removed from or added to this list to suit the characteristics of a particular survey area.

Table V-I Land use activities to be entered in the Primary, Secondary or Tertiary Activity fields on the data entry form.

Land Use Activity	*Description / Examples*
Agriculture	Property with agricultural activity generating product(s) for sale, e.g. beef operation, nursery, vegetable production
Commercial/Service Use	Store, gas station
Cultural/Entertainment Use	Zoo, museum
Freshwater aquaculture	Hatchery
Golf Course	
Hobby – Amenity Use	Property with agricultural activity, but for amenity use only, i.e. no indication of farm products for sale (e.g. residential property with 1 horse)
Indian Reserve	
Industrial Use	Wood processing plant
Institutional Use	School, church
Land in Transition	Construction site, tree removal
Military Area	
Mineral extraction	Gravel pit
Mobile Home Park	RV & Mobile Home Park
Not in use	Natural state (e.g. wooded area, trees, wetland, riparian, ravine)
Park	Officially designated green space for public use
Recreational Use	Trails, running track
Residential Use	Home or mobile home. Classified as Primary Activity when house (plus pool and garage etc.) ≥ 25% of the total property area.
Residential Use – Multi-family	Apartment, townhouse
Storage Yard	Junkyard, car/truck storage
Transportation and communication	Airport, road right-of-way
Unused farmland	Abandoned pasture
Utility	Power lines, pumphouse
Vacant	Neglected property that has signs of previous urban use, e.g. signs of demolished buildings
Water Management	Majority of area consists of watercourse(s)/ waterbody, shoreline, dyke
Wildlife Area	Designated wildlife area, e.g. bird sanctuary, habitat protection area, wildlife rehabilitation centre, wildlife management area.

Agricultural Land Use Activities

The following table (Table V-II) outlines various agricultural land use activities that can be entered in the Primary, Secondary, Tertiary or Quaternary Agricultural Activity fields on the data entry form. Items may be removed from or added to this list to suit the characteristics of a particular survey area.

Table V-II Agricultural land use activities to be entered in Agricultural Activity fields on the data entry form.

Agri-commercial
Agritourism
Allotment Gardens
Apiary
Beef Cattle Farm
Berry Farm
Christmas Tree Farm
Commercial Cat Kennel
Commercial Dog Kennel
Crop Preparation/Processing
Cultivated Land
Dairy Farm
Donkey Farm
Dry cow facility
Duck Farm
Equestrian Facility
Fallow Land
Feedlot
Field Flower Farm
Field Vegetable Farm
Forage Operation
Fur Farm
Game Bird Farm
Game Farm
Ginseng Farm
Grain Production
Greenhouse Operation
Horse Farm
Horse Farm -Breeder
Livestock operation - type unknown
Llama/Alpaca Farm
Mixed Livestock (small-scale)
Mushroom Farm
Nursery
Nursery (incl. Greenhouses)
Nut Farm
On-farm Bed and Breakfast
Orchard
Pasture
Poultry - backyard flock
Poultry Farm
Range
Ratite Farm
Sheep/Goat Farm
Specialty Crop Production
Stable/Riding Facility
Swine operation
Tree Farm
Turf Farm
Veterinary Clinic
Vineyard
Vineyard (incl. Winery)
Water Management
Winery
Woodlot

Condition of Land Covers

Table V-III below describes the values that can be entered into the Condition field of the Land Cover table.

Table V-III **Descriptive comments about the state or condition of the land cover. Values are entered in the Condition field on the data entry form.**

Abandoned – The state of a structure or planting that exhibits signs of prolonged neglect, implying that the original use of the structure or planting has not occurred recently and likely will not be resumed in the future.

Neglected – The state of a structure or planting that exhibits some signs of neglect (e.g. tall weeds between blueberry bushes) but implying the possibility of resumed or improved activity.

Inactive – The state of a structure that does not necessarily exhibit signs of neglect, but the use of which is discontinued for the time being, e.g. an empty dairy barn.

New – May pertain to any structure or planting and means that the item has obviously just been established or was not found on recent air photos.

Under construction – means that a structure is in the process of being built.

Small – For purposes of this survey "small" describes non-commercial structures or plantings, such as a two-stall horse barn or garden crops, or may describe the size of a storage structure or facility.

Large – For purposes of this survey "large" describes commercial structures or the size of a farm structure.

Land Cover Codes

Table V-IV, starting on page 33, lists the land cover codes to be recorded in the Cover field on the data entry form. The six major categories of land covers include: Agriculture (AL), Mineral extraction (M), Recreation (R), Settlement (S), Vegetated areas (V) and Water Management areas (WM). Codes were originally based on the RIC (Resource Inventory Committee) system and have been adapted as needed. Codes may be added or removed to suit the characteristics of a particular study area.

Agricultural Practice Codes (AP)

Table V-V on Page 38 lists the codes that describe the agricultural practices occurring on the parcel. The code is entered in the Practice field on the data entry form. More than one type of practice can be entered if necessary.

Livestock Codes (AP8)

Table V-VI on Page 39 lists the codes describing the livestock on the farm. More than one type of livestock can be entered if necessary. The code is entered in the Livestock field on the data entry form.

Table V-IV Land Cover codes to be entered in the Cover field on the data entry form

AL000 Agriculture

AL100 Field crop production

AL110 Grains, cereals and oilseeds
- AL111 Barley
- AL112 Canola
- AL113 Oats
- AL114 Rye
- AL115 Wheat

AL120 Tree fruit crops
- AL121 Apples
- AL122 Apricots
- AL123 Cherries
- AL124 Crabapples
- AL125 Peaches
- AL126 Pears
- AL127 Plums
- AL128 Nectarines

AL130 Vine and berry crops
- AL131 Vine crops
  - AL131.1 Grapes
  - AL131.2 Kiwis
  - AL131.3 Blackberries
- AL132 Berries
  - AL132.1 Blueberries
  - AL132.2 Cranberries
  - AL132.3 Currants
  - AL132.4 Gooseberries
  - AL132.5 Loganberries
  - AL132.6 Raspberries
  - AL132.7 Saskatoonberries
  - AL132.8 Strawberries
  - AL132.9 Tayberries

AL140 Forage and pasture crops
- AL141 Used pasture
  - AL141.1 Grass
    - AL141.11 Perennial
    - AL141.12 Annual
  - AL141.2 Legume
    - AL141.21 Perennial
    - AL141.22 Annual
  - AL141.3 Forage cereal
  - AL141.4 Forage corn
- AL142 Unused pasture
  - AL142.1 Good condition
  - AL142.2 Poor condition
- AL143 Range

AL150 Vegetable crops
- AL151 Cole crop
  - AL151.1 Broccoli
  - AL151.2 Brussel sprouts
  - AL151.3 Cabbage
  - AL151.4 Cauliflower
  - AL151.5 Kale
  - AL151.6 Kohlrabi
- AL152 Cucurbits
  - AL152.1 Cucumbers
  - AL152.2 Marrow
  - AL152.3 Pumpkin
  - AL152.4 Squash
  - AL152.5 Zucchini
- AL153 Leafy vegetables
  - AL153.1 Celery
  - AL153.2 Lettuce
  - AL153.3 Spinach
  - AL153.4 Swiss chard
- AL154 Legumes
  - AL154.1 Beans
  - AL154.2 Peas
- AL155 Root vegetables
  - AL155.1 Beet
  - AL155.2 Carrots
  - AL155.3 Onions
  - AL155.4 Parsnip
  - AL155.5 Potatoes
  - AL155.6 Radish
  - AL155.7 Turnip
- AL156 Misc. vegetables
  - AL156.1 Peppers
  - AL156.2 Sweet Corn
  - AL156.3 Leek
  - AL156.4 Tomatoes

AL160 Floriculture
- AL161 Bulbs
  - AL161.1 Daffodil
  - AL161.2 Iris
  - AL161.3 Gladiolas
  - AL161.4 Tulip
- AL162 Cut flowers
  - AL162.1 Aster
  - AL162.2 Orchid
  - AL162.3 Rose
  - AL162.4 Sunflower
  - AL162.5 Sweet pea
- AL163 Bedding plants

AL170 Specialty crops
- AL171 Medicinal
  - AL171.1 Ginseng
  - AL171.2 Echinacea
- AL172 Turf

Table V-IV Land Cover codes to be entered in the Cover field on the data entry form (Cont'd)

- AL173 Nuts
  - AL173.1 Hazelnut
  - AL173.2 Walnut
  - AL173.3 Filbert
- AL174 Woody cuts
  - AL174.1 Holly
  - AL174.2 Viburnum
  - AL174.3 Willow
  - AL174.4 Witchhazel
- AL175 Misc. specialty crops
  - AL175.1 Asparagus
  - AL175.2 Garlic
  - AL175.3 Herbs
  - AL175.4 Hops
  - AL175.5 Mushroom
  - AL175.6 Rhubarb

AL180 Nursery
- AL181 Trees (plantation)
  - AL181.1 Christmas trees
  - AL181.2 Fine wood
  - AL181.3 Fibre/pulp
  - AL181.4 Forestry stock
  - AL181.5 Fuel
- AL182 Ornamentals and shrubs
  - AL182.1 Cedar hedging

AL190 Unspecified/other crops
- AL191 Cultivated land
- AL192 Fallow land

AL200 Housed crop production
- AL210 Residential/hobby greenhouse
- AL220 Commercial greenhouse
  - AL221 Vegetables
  - AL222 Floriculture
  - AL223 Tropicals and other specialty plants
  - AL224 Nursery
- AL230 Cold frame
- AL240 Mushroom barn

AL300 Housed and site based animal production
- AL310 Housing animals
- AL320 Feedlot
  - AL321 Woodwaste feedlot
  - AL322 Sand feedlot
  - AL323 Concrete feedlot
- AL330 Seasonal feeding area
- AL340 Corral/paddock
  - AL341 Woodwaste corral/paddock
  - AL342 Sand corral/paddock
  - AL343 Concrete corral/paddock
- AL350 Equestrian facility
  - AL351 Outdoor riding ring
    - AL351.1 Woodwaste riding ring
    - AL351.2 Sand riding ring
  - AL352 Indoor riding ring
    - AL352.1 Indoor riding ring w/attached stalls
  - AL353 Equestrian racetrack
- AL360 Commercial dog kennel
  - AL361 Doggie day care
- AL370 Bee hives
- AL400 Code not in use
- AL500 Freshwater aquaculture
- AL600 Marine aquaculture

AL700 Farm accessories
- AL710 Storage
  - AL711 Crop storage
    - AL711.1 Bunker silo
    - AL711.2 Upright silo
    - AL711.3 Hayshed
    - AL711.4 Silage bags
    - AL711.5 Refrigerated storage, fruits and vegetables
    - AL711.6 Non-refrigerated storage, fruits and vegetables
    - AL711.7 Granary/grain bin
  - AL712 Chemical storage
    - AL712.1 Fertilizer storage
    - AL712.2 Pesticide storage
    - AL712.3 Fuel storage
  - AL713 Machinery and tool storage
  - AL714 Woodwaste storage
    - AL714.1 Woodwaste facility
      - AL714.11 Covered
      - AL714.12 Uncovered
    - AL714.2 Woodwaste pile
      - AL714.21 Covered
      - AL714.22 Uncovered
  - AL715 Storage shed, contents unknown
- AL720 On farm preparation and processing
  - AL72 Crop preparation/ processing facility

Table V-IV Land Cover codes to be entered in the Cover field on the data entry form.

AL000 Agriculture

AL100 Field crop production

AL110 Grains, cereals and oilseeds
- AL111 Barley
- AL112 Canola
- AL113 Oats
- AL114 Rye
- AL115 Wheat

AL120 Tree fruit crops
- AL121 Apples
- AL122 Apricots
- AL123 Cherries
- AL124 Crabapples
- AL125 Peaches
- AL126 Pears
- AL127 Plums
- AL128 Nectarines

AL130 Vine and berry crops
- AL131 Vine crops
  - AL131.1 Grapes
  - AL131.2 Kiwis
  - AL131.3 Blackberries
- AL132 Berries
  - AL132.1 Blueberries
  - AL132.2 Cranberries
  - AL132.3 Currants
  - AL132.4 Gooseberries
  - AL132.5 Loganberries
  - AL132.6 Raspberries
  - AL132.7 Saskatoonberries
  - AL132.8 Strawberries
  - AL132.9 Taylberries

AL140 Forage and pasture crops
- AL141 Used pasture
  - AL141.1 Grass
    - AL141.11 Perennial
    - AL141.12 Annual
  - AL141.2 Legume
    - AL141.21 Perennial
    - AL141.22 Annual
  - AL141.3 Forage cereal
  - AL141.4 Forage corn
- AL142 Unused pasture
  - AL142.1 Good condition
  - AL142.2 Poor condition
- AL143 Range

AL150 Vegetable crops
- AL151 Cole crop
  - AL151.1 Broccoli
  - AL151.2 Brussel sprouts
  - AL151.3 Cabbage
  - AL151.4 Cauliflower
  - AL151.5 Kale
  - AL151.6 Kohlrabi
- AL152 Cucurbits
  - AL152.1 Cucumbers
  - AL152.2 Marrow
  - AL152.3 Pumpkin
  - AL152.4 Squash
  - AL152.5 Zucchini
- AL153 Leafy vegetables
  - AL153.1 Celery
  - AL153.2 Lettuce
  - AL153.3 Spinach
  - AL153.4 Swiss chard
- AL154 Legumes
  - AL154.1 Beans
  - AL154.2 Peas
- AL155 Root vegetables
  - AL155.1 Beet
  - AL155.2 Carrots
  - AL155.3 Onions
  - AL155.4 Parsnip
  - AL155.5 Potatoes
  - AL155.6 Radish
  - AL155.7 Turnip
- AL156 Misc. vegetables
  - AL156.1 Peppers
  - AL156.2 Sweet Corn
  - AL156.3 Leek
  - AL156.4 Tomatoes

AL160 Floriculture
- AL161 Bulbs
  - AL161.1 Daffodil
  - AL161.2 Iris
  - AL161.3 Gladiolus
  - AL161.4 Tulip
- AL162 Cut flowers
  - AL162.1 Aster
  - AL162.2 Orchid
  - AL162.3 Rose
  - AL162.4 Sunflower
  - AL162.5 Sweet pea
- AL163 Bedding plants

AL170 Specialty crops
- AL171 Medicinal
  - AL171.1 Ginseng
  - AL171.2 Echinacea
- AL172 Tutu

Table V-IV Land Cover codes to be entered in the Cover field on the data entry form. (Cont'd)

AL173 Nuts
AL173.1 Hazelnut
AL173.2 Walnut
AL173.3 Filbert
AL174 Woody vines
AL174.1 Holly
AL174.2 Vinemaple
AL174.3 Willow
AL174.4 Withe/osier
AL175 Misc. specialty crops
AL175.1 Asparagus
AL175.2 Garlic
AL175.3 Herbs
AL175.4 Hops
AL175.5 Mushroom
AL175.6 Rhubarb

AL180 Nursery
AL181 Trees (plantation)
AL181.1 Christmas trees
AL181.2 Fine wood
AL181.3 Fibre/pulp
AL181.4 Forestry stock
AL181.5 Fuel
AL182 Ornamentals and shrubs
AL182.1 Cedar hedging

AL190 Unspecified other crops
AL191 Cultivated land
AL192 Fallow land

AL200 Housed crop production
AL210 Residential/hobby greenhouse
AL220 Commercial greenhouse
AL221 Vegetables
AL222 Floriculture
AL223 Tropicals and other specialty plants
AL224 Nursery
AL230 Cold frame
AL240 Mushroom barn

AL300 Housed and site based animal production
AL310 Housing animals
AL320 Feedlot
AL321 Woodwaste feedlot
AL322 Sand feedlot
AL323 Concrete feedlot
AL330 Seasonal feeding area
AL340 Corral/paddock
AL341 Woodwaste corral/paddock
AL342 Sand corral/paddock
AL343 Concrete corral/paddock
AL350 Equestrian facility
AL351 Outdoor riding ring
AL351.1 Woodwaste riding ring
AL351.2 Sand riding ring
AL352 Indoor riding ring
AL352.1 Indoor riding ring w/attached stalls
AL353 Equestrian racetrack
AL360 Commercial dog kennel
AL361 Doggie day care
AL370 Bee hives
AL400 Code not in use
AL500 Freshwater aquaculture
AL600 Marine aquaculture

AL700 Farm accessories
AL710 Storage
AL711 Crop storage
AL711.1 Bunker silo
AL711.2 Upright silo
AL711.3 Hayshed
AL711.4 Silage bags
AL711.5 Refrigerated storage, fruits and vegetables
AL711.6 Non-refrigerated storage, fruits and vegetables
AL711.7 Granary/grain bin
AL712 Chemical storage
AL712.1 Fertilizer storage
AL712.2 Pesticide storage
AL712.3 Fuel storage
AL713 Machinery and tool storage
AL714 Woodwaste storage
AL714.1 Woodwaste facility
AL714.11 Covered
AL714.12 Uncovered
AL714.2 Woodwaste pile
AL714.21 Covered
AL714.22 Uncovered
AL715 Storage shed: contents unknown

AL720 On-farm preparation and processing
AL72 Crop preparation/processing facility

Table V-IV **Land Cover codes to be entered in the Cover field on the data entry forms (continued)**

- AL722 Egg-sorting facility
- AL723 Livestock processing facility
- AL724 Milkhouse or milking parlour
- AL725 Winery
- AL726 Winery with restaurant
- AL727 Feed processing

- AL730 Direct marketing structure
  - AL731 Permanent store
    - AL731.1 Produce
    - AL731.2 Floriculture and/or tropicals
    - AL731.3 Nursery
  - AL732 Seasonal/temporary produce stand

- AL740 Composting facility
  - AL741 Vegetative compost
    - AL741.1 Pile on pad
      - AL741.11 Covered
      - AL741.12 Uncovered
    - AL741.2 Pile
      - AL741.21 Covered
      - AL741.22 Uncovered
  - AL742 Mushroom medium compost
    - AL742.1 Facility
    - AL742.2 Pile on pad
      - AL742.21 Covered
      - AL742.22 Uncovered
    - AL742.3 Pile
      - AL742.31 Covered
      - AL742.32 Uncovered
  - AL743 Spent mushroom medium
    - AL743.1 Pile on pad
      - AL743.11 Covered
      - AL743.12 Uncovered
    - AL743.2 Pile
      - AL743.21 Covered
      - AL743.22 Uncovered

- AL750 Manure facility
  - AL751 Concrete or Metal Tank
    - AL751.1 Covered
    - AL751.2 Uncovered
  - AL752 Concrete Pad
    - AL752.1 Covered
    - AL752.2 Uncovered
  - AL753 Concrete Lagoon
    - AL753.1 Covered
    - AL753.2 Uncovered
  - AL754 Earthen Lagoon
  - AL755 Bin
  - AL756 On ground storage
    - AL756.1 Covered
    - AL756.2 Uncovered

- AL760 Well
  - AL761 Domestic
  - AL762 Irrigation
  - AL763 Stock Watering

- AL770 Pumps
  - AL771 Drainage
    - AL771.1 Electric Motor
    - AL771.2 Combustion Motor
  - AL772 Irrigation
    - AL772.1 Electric Motor
    - AL772.2 Combustion Motor

- AL780 Farm building, type unknown

- **AL800 Inactive agricultural land and facilities**
- AL810 Abandoned or neglected farm land
  - AL811 Neglected grassland
  - AL812 Neglected vegetative area
- AL820 Abandoned or unused farm structure
- AL830 Land in transition
- AL840 Farm yard area

M000 Mineral extraction

- M100 Surface mining and quarrying
- M110 Open pit metal mines
- M120 Open pit coal mines
- M130 Quarries-rock and industrial minerals
- M140 Peat extraction
- M150 Topsoil removal
- M160 Extraction of gravels and sands
- M170 Other surface extraction

R000 Recreation

- R100 Intensive facility based recreational activities
- R110 Municipal and regional open spaces
  - R111 Municipal or regional park
  - R112 Picnic area/playground
  - R113 Zoo
  - R114 Garden
- R120 Golf course
  - R121 Driving range

Table V-IV Land Cover codes to be entered in the Cover field on the data entry form (continued)

- R122 Clubhouse
- R130 Indoor recreation or sports facility
- R140 Outdoor sports and recreation
  - R141 Tennis court
  - R142 Swimming pool
  - R143 Sports field
  - R144 Running track
  - R145 Vehicle race track
  - R146 Shooting range
- R150 Trail or corridor, walking and bicycle
- R160 Fairground, amusement park

S000 Settlement

- **S100 Residential**
- S110 House
  - S111 Single family dwelling
    - S111.1 Small house (<1500 sq ft)
    - S111.2 Medium house (1500-3500 sq ft)
    - S111.3 Large house (3500-5000 sq ft)
    - S111.4 Very large house (>5000 sq ft)
  - S112 Duplex
- S120 Residential features
  - S121 Yard , lawn or landscaping
  - S122 Auxiliary building, e.g. garage or workshop
  - S123 Parking area / roadway
    - S123.1 Impervious (paved)
    - S123.2 Pervious (dirt or gravel)
  - S124 Tennis court
  - S125 Swimming pool
  - S126 Landscaped/decorative pond
- S130 Attached (apartment and townhouse)
- S140 Mobile home
  - S141 Mobile home park/RV Park
- S150 Ancillary residential (e.g. picker cabin)
  - S151 Home based business
  - S152 Home based Bed & Breakfast
- S160 Construction and resource employee camp
- S170 Junk storage

- **S200 Commercial and service facilities**
- S210 Retail, services, office
  - S211 Store
  - S212 Strip Mall
  - S213 Restaurant
  - S214 Office building
  - S215 Automotive shop
  - S216 Veterinary clinic
  - S217 Gas station
  - S218 Garden centre
- S220 Wholesale and warehouse facility
  - S221 Storage
- S230 Hotel or motel
- S240 Cultural or entertainment facility
  - S241 Museum
  - S242 Library
  - S243 Outdoor stage
  - S244 Movie theatre
- S250 Parking area/roadway
  - S251 Impervious (paved)
  - S252 Pervious (dirt or gravel)

- **S300 Industrial**
- S310 Light industry
  - S311 Recycling facility
  - S312 Soil mixing facility
  - S313 Composting facility
- S320 Medium and heavy industry
  - S321 Cement plant
  - S322 Chemical plant
  - S323 Wood processing facility
  - S324 Manufacturing facility
  - S325 Gravel processing operation
- S330 Food processing
- S340 Oil and gas storage tank farm
- S350 Outdoor material and equipment storage
- S360 Auto wrecker

- **S400 Institutional**
- S410 Government
  - S411 Office
  - S412 Fire hall
  - S413 Police office
  - S414 Municipal hall, court house
  - S415 Maintenance yard
- S420 Religious facility, e.g. church
- S430 Hospitals or medical centre
- S440 Education facility
  - S441 Pre-school
  - S442 Elementary

Table V-IV Land Cover codes to be entered in the Cover field on the data entry form. (Cont'd)

AL722 Egg sorting facility
AL723 Livestock processing facility
AL724 Milkhouse or milking parlour
AL725 Winery
AL726 Winery with restaurant
AL727 Feed processing

AL730 Direct marketing structure
AL731 Permanent store
AL731.1 Produce
AL731.2 Floriculture and/or ornamentals
AL731.3 Nursery
AL732 Seasonal/temporary produce stand

AL740 Composting facility
AL741 Vegetative compost
AL741.1 Pile on pad
AL741.11 Covered
AL741.12 Uncovered
AL741.2 Pile
AL741.21 Covered
AL741.22 Uncovered
AL742 Mushroom medium compost
AL742.1 Facility
AL742.2 Pile on pad
AL742.21 Covered
AL742.22 Uncovered
AL742.3 Pile
AL742.31 Covered
AL742.32 Uncovered
AL743 Spent mushroom medium
AL743.1 Pile on pad
AL743.11 Covered
AL743.12 Uncovered
AL743.2 Pile
AL743.21 Covered
AL743.22 Uncovered

AL750 Manure facility
AL751 Concrete or Metal Tank
AL751.1 Covered
AL751.2 Uncovered
AL752 Concrete Pad
AL752.1 Covered
AL752.2 Uncovered
AL753 Concrete Lagoon
AL753.1 Covered
AL753.2 Uncovered
AL754 Earthen Lagoon
AL755 Bin
AL756 On ground storage
AL756.1 Covered
AL756.2 Uncovered

AL760 Well
AL761 Domestic
AL762 Irrigation
AL763 Stock Watering

AL770 Pumps
AL771 Drainage
AL771.1 Electric Motor
AL771.2 Combustion Motor
AL772 Irrigation
AL772.1 Electric Motor
AL772.2 Combustion Motor

AL780 Farm building, type unknown

AL800 Inactive agricultural land and facilities
AL810 Abandoned or neglected farm land
AL811 Neglected grassland
AL812 Neglected vegetative area
AL820 Abandoned or unused farm structure
AL830 Land in transition
AL840 Farm yard area

M000 Mineral extraction

M100 Surface mining and quarrying
M110 Open pit metal mines
M120 Open pit coal mines
M130 Quarries rock and industrial minerals
M140 Peat extraction
M150 Topsoil removal
M160 Extraction of gravels and sands
M170 Other surface extraction

R000 Recreation

R100 Intensive facility based recreational activities
R110 Municipal and regional open spaces
R111 Municipal or regional park
R112 Picnic area/playground
R113 Zoo
R114 Garden
R120 Golf course
R121 Driving range

Table V-IV Land Cover codes to be entered in the Cover field on the data entry form. (Cont'd)

R122 Clubhouse
R130 Indoor recreational sports facility
R140 Outdoor sports and recreation
R141 Tennis court
R142 Swimming pool
R143 Sports field
R144 Running track
R145 Vehicle race track
R146 Shooting range
R150 Trail or corridor, walking and bicycle
R160 Fairground, amusement park

S000 Settlement

S100 Residential
S110 House
S111 Single family dwelling
S111-1 Small house (<1500 sq ft)
S111-2 Medium house (1500-3500 sq ft)
S111-3 Large house (3500-5000 sq ft)
S111-4 Very large house (>5000 sq ft)
S112 Duplex
S120 Residential features
S121 Yard: lawn or landscaping
S122 Auxiliary building: e.g. garage or workshop
S123 Parking area - roadway
S123-1 Impervious (paved)
S123-2 Pervious (dirt or gravel)
S124 Tennis court
S125 Swimming pool
S126 Landscaped/decorative pond
S130 Attached (apartment and townhouse)
S140 Mobile home
S141 Mobile home park, RV Park
S150 Ancillary residential (e.g. picket cabin)
S151 Home based business
S152 Home based Bed & Breakfast
S160 Construction and resource employee camp
S170 Tank storage

S200 Commercial and service facilities
S210 Retail, services, office
S211 Store
S212 Strip Mall
S213 Restaurant
S214 Office building
S215 Automotive shop
S216 Veterinary clinic
S217 Gas station
S218 Garden centre
S220 Wholesale and warehouse facility
S221 Storage
S230 Hotel or motel
S240 Cultural or entertainment facility
S241 Museum
S242 Library
S243 Outdoor stage
S244 Movie theatre
S250 Parking area/roadway
S251 Impervious (paved)
S252 Pervious (dirt or gravel)

S300 Industrial
S310 Light industry
S311 Recycling facility
S312 Soil mixing facility
S313 Composting facility
S320 Medium and heavy industry
S321 Cement plant
S322 Chemical plant
S323 Wood processing facility
S324 Manufacturing facility
S325 Gravel processing operation
S330 Food processing
S340 Oil and gas storage tank farm
S350 Outdoor material and equipment storage
S360 Auto wrecker

S400 Institutional
S410 Government
S411 Office
S412 Fire hall
S413 Police office
S414 Municipal hall, court house
S415 Maintenance yard
S420 Religious facility, e.g. church
S430 Hospitals or medical centre
S440 Education facility
S441 Pre-school
S442 Elementary

Table V-IV Land Cover codes to be entered in the Cover field on the data entry form (cont'd)

- S443 Junior/middle high
- S444 Senior high
- S445 Post-secondary
- S446 Trade school
- S447 Religious

S450 Jails, prisons, other correctional facility
S460 Meeting or assembly hall
S470 Adult care facility
S480 Cemetery/Memorial garden

S500 Transportation and Communications

S510 Highway
S520 Railway
S530 Airport
S540 Marina or dock
S550 Road
S560 Radio/telecommunications facility

S600 Utilities

S610 Energy transmission and distribution
S620 Solid waste facility
S630 Liquid waste facility
S640 Domestic water tanks and distribution facility
S650 Pump station
S660 Pipeline
S700 Not in use
S800 Military
S810 Military training facility
S820 Military testing facility
S830 Other military

V000 Vegetated areas

V100 Non-riparian
V110 Treed
- V111 Coniferous
- V112 Broadleaf
- V113 Mixed

V120 Non-Treed
- V121 Tall shrubs (>2 m)
- V122 Low shrubs (< 2m)
- V123 Herbaceous vegetation (fern, grasses, forbs)

V200 Riparian
V210 Treed
- V211 Coniferous
- V212 Broadleaf
- V213 Mixed

V220 Non-Treed
- V221 Tall shrubs (>2 m)
- V222 Low shrubs (< 2m)
- V223 Herbaceous vegetation (fern, grasses, forbs)

WM000 Water Management Areas

WM100 Natural Watercourses
WM110 Streams
WM120 Lakes
WM130 Wetlands
WM140 Foreshore area
WM150 Slough (Backwatered/cutoff channel)

WM200 Channelized Watercourse
WM210 Dyked Watercourse
WM220 Straightened Watercourse
WM230 Diversion Channel

WM300 Constructed Ditch
WM310 Drainage Ditch
WM320 Irrigation Diversion Channel
WM330 Other Diversion Channel

WM400 Reservoirs
WM410 Farm Ponds (dug)
- WM411 Irrigation pond
- WM412 Retention/detention pond
- WM413 Settling pond
- WM414 Wastewater collection

WM420 Damned Reservoirs
- WM421 Hydroelectric Reservoir
- WM422 Water supply Reservoir
- WM423 Multi-purpose Reservoir

WM500 Managed wetlands
WM510 Managed fresh water wetlands
WM520 Managed salt water and brackish wetlands

WM600 Watersheds
WM610 Designated community watersheds
WM620 Undesignated water supply watersheds
WM700 Dyke

Table V-V Agricultural Practice codes to be entered in the Practice field on the data entry form.

AP000 Agricultural Practices

AP100 Crop Protection/Enhancement
AP110 Crop support/Trellis
AP120 Integrated Pest Management
AP130 Material application
- AP131 Fertilizer
  - AP131.1 Compost
  - AP131.2 Manure
  - AP131.3 Synthetic fertilizer
- AP132 Mulch
  - AP132.1 Compost
  - AP132.2 Plastic
  - AP132.3 Straw
  - AP132.4 Topsoil
  - AP132.5 Vegetative debris
  - AP132.6 Woodwaste
- AP133 Pesticide application
  - AP133.1 Fungicide
  - AP133.2 Herbicide
  - AP133.3 Insecticide
  - AP133.4 Molluscicide

AP140 Noise generation
- AP141 AV alarms
- AP142 Bird distress calls
- AP143 Propane exploders

AP150 Organic/No spray
AP160 Physical wildlife barrier
- AP161 Fencing

AP162 Netting
AP170 Temperature/light control
- AP171 Shade cloth
  - AP171.1 Cloth
  - AP171.2 Plastic
- AP172 Tunnel/floating cover
  - AP172.1 Cloth
  - AP172.2 Plastic
- AP173 Wind machine

AP180 Wind break
- AP181 Fencing
- AP182 Treed buffer strip

AP190 Stream bank enhancement
- AP191 Grass buffer strip
- AP192 Livestock fencing
- AP193 Riparian planting

AP200 Irrigation
AP210 Surface irrigation
- AP211 Flood
- AP212 Furrow

AP220 Sub-surface irrigation
AP230 Sprinkler irrigation
- AP231 Handline sprinkler
- AP232 Wheeline sprinkler
- AP233 Solid set
  - AP233.1 Undertree
  - AP233.2 Overtree
- AP234 Microsprinkler

AP240 Centre pivot sprinkler
- AP241 Low pressure pivot

AP250 Giant gun
- AP251 Stationary gun
- AP252 Travelling gun
- AP253 Solid set gun

AP260 Trickle irrigation
- AP261 Drip emitter
  - AP261.1 Drip, buried
  - AP261.2 Drip, above ground
- AP262 Spray emitter

AP300 Drainage
AP310 Surface
AP320 Sub-surface

AP400 Direct Farm Marketing
AP410 Products for sale
AP420 U-Pick
AP430 Xmas tree cutting

AP500 Agritourism
AP510 Corn Maze
AP520 Petting farm
AP530 Holiday events
AP540 Accommodation
- AP541 Guest ranch
- AP542 On-farm Bed & Breakfast

AP600 Agroforestry

AP700 Cultivation
AP710 Contour planting
AP720 Contour ploughing
AP730 Conventional till
AP740 Minimum till
AP750 Downslope planting
AP760 Downslope ploughing
AP770 No till

AP900 Commodity specific practices
AP910 Forage crops
- AP911 Grazing/pasture
- AP912 Seed
- AP913 Silage or hay
  - AP913.1 Silage
  - AP913.2 Hay

AP920 Nursery crops
- AP921 Bare root
- AP922 Ball and burlap
- AP923 Container
- AP924 Caliper

AP930 Tree fruits
- AP931 Espalier

Table V-IV Land Cover codes to be entered in the Cover field on the data entry form. (Cont'd)

S443 Junior / middle high
S444 Senior high
S445 Post-secondary
S446 Trade school
S447 Religious
S450 Jails, prisons, other correctional facility
S460 Meeting or assembly hall
S470 Adult care facility
S480 Cemetery/Memorial garden

S500 Transportation and Communications

S510 Highway
S520 Railway
S530 Airport
S540 Marina or dock
S550 Road
S560 Radio/telecommunications facility

S600 Utilities

S610 Energy transmission and distribution
S620 Solid waste facility
S630 Liquid waste facility
S640 Domestic water tanks and distribution facility
S650 Pump station
S660 Pipeline
S700 Not in use
S800 Military
S810 Military training facility
S820 Military testing facility
S830 Other military

V000 Vegetated areas

V100 Non-riparian
V110 Treed
- V111 Coniferous
- V112 Broadleaf
- V113 Mixed

V120 Non-Treed
- V121 Tall shrubs (>2 m)
- V122 Low shrubs (< 2m)
- V123 Herbaceous vegetation (fern, grasses, forbs)

V200 Riparian
V210 Treed
- V211 Coniferous
- V212 Broadleaf
- V213 Mixed

V220 Non-Treed
- V221 Tall shrubs (>2 m)
- V222 Low shrubs (< 2m)
- V223 Herbaceous vegetation (fern, grasses, forbs)

WM1000 Water Management Areas

WM100 Natural Watercourses
WM110 Streams
WM120 Lakes
WM130 Wetlands
WM140 Foreshore area
WM150 Slough (backwatered/runoff channel)
WM200 Channelized Watercourse
- WM210 Dyked Watercourse
- WM220 Straightened Watercourse
- WM230 Diversion Channel

WM300 Constructed Ditch
- WM310 Drainage Ditch
- WM320 Irrigation Diversion Channel
- WM330 Other Diversion Channel

WM400 Reservoirs
WM410 Farm Ponds (dug)
- WM411 Irrigation pond
- WM412 Retention/detention pond
- WM413 Settling pond
- WM414 Wastewater collection

WM420 Dammed Reservoirs
- WM421 Hydroelectric Reservoir
- WM422 Water supply Reservoir
- WM423 Multi-purpose Reservoir

WM500 Managed wetlands
WM510 Managed fresh water wetlands
WM520 Managed salt water and brackish wetlands

WM600 Watersheds
WM610 Designated community watersheds
WM620 Undesignated water supply watersheds
WM700 Dyke

Table V-V Agricultural Practice codes to be entered in the Practice field on the data entry form.

AP000 Agricultural Practices

AP100 Crop Protection/Enhancement
AP110 Crop support/Trellis
AP120 Integrated Pest Management
AP130 Material application
AP131 Fertilizer
AP131.1 Compost
AP131.2 Manure
AP131.3 Synthetic fertilizer
AP132 Mulch
AP132.1 Compost
AP132.2 Plastic
AP132.3 Straw
AP132.4 Topsoil
AP132.5 Vegetative debris
AP132.6 Woodwaste
AP133 Pesticide application
AP133.1 Fungicide
AP133.2 Herbicide
AP133.3 Insecticide
AP133.4 Molluscicide
AP140 Noise penetration
AP141 AV alarms
AP142 Bird distress calls
AP143 Propane exploders
AP150 Organic/No spray
AP160 Physical wildlife barrier
AP161 Fencing
AP162 Netting
AP170 Temperature/light control
AP171 Shade cloth
AP171.1 Cloth
AP171.2 Plastic
AP172 Tunnel/floating cover
AP172.1 Cloth
AP172.2 Plastic
AP173 Wind machine
AP180 Wind break
AP181 Fencing
AP182 Treed buffer strip
AP190 Stream bank enhancement
AP191 Grass buffer strip
AP192 Livestock fencing
AP193 Riparian planting

AP200 Irrigation
AP210 Surface irrigation
AP211 Flood
AP212 Furrow
AP220 Sub-surface irrigation
AP230 Sprinkler irrigation
AP231 Handline sprinkler
AP232 Wheeline sprinkler
AP233 Solid set
AP233.1 Undertree
AP233.2 Overtree
AP234 Microsprinkler
AP240 Centre pivot sprinkler
AP241 Low pressure pivot
AP250 Giant gun
AP251 Stationary gun
AP252 Travelling gun
AP253 Solid set gun
AP260 Trickle irrigation
AP261 Drip emitter
AP261.1 Drip buried
AP261.2 Drip above ground
AP262 Spray emitter

AP300 Drainage
AP310 Surface
AP320 Sub-surface

AP400 Direct Farm Marketing
AP410 Products for sale
AP420 U-Pick
AP430 Xmas tree cutting

AP500 Agritourism
AP510 Corn Maze
AP520 Petting farm
AP530 Holiday events
AP540 Accommodation
AP541 Guest ranch
AP542 On-farm Bed & Breakfast

AP600 Agroforestry

AP700 Cultivation
AP710 Contour planting
AP720 Contour ploughing
AP730 Conventional till
AP740 Minimum till
AP750 Downslope planting
AP760 Downslope ploughing
AP770 No till

AP900 Commodity specific practices
AP910 Forage crops
AP911 Grazing/pasture
AP912 Seed
AP913 Silage or hay
AP913.1 Silage
AP913.2 Hay
AP920 Nursery crops
AP921 Bare root
AP922 Ball and burlap
AP923 Container
AP924 Caliper
AP930 Tree fruits
AP931 Espalier

Table V-VI Livestock codes to be entered in the Livestock field on the data entry form.

AP800 Livestock

AP810 Conventional livestock
- AP811 Dairy cattle
- AP812 Beef cattle
  - AP812.1 Veal
- AP813 Horse
  - AP813.1 Pony
  - AP813.2 Miniature horse
- AP814 Swine
  - AP814.1 Breeder
  - AP814.2 Farrow
  - AP814.3 Farrow to finish
  - AP814.4 Feeder
  - AP814.5 Weaner
- AP815 Sheep
- AP816 Goat
- AP817 Donkey
- AP818 Mule

AP820 Specialty livestock
- AP821 Llama
- AP822 Alpaca
- AP823 Musk ox
- AP824 Game
  - AP824.1 Deer
  - AP824.2 Reindeer
  - AP824.3 Bison
  - AP824.4 Elk
- AP825 Game bird
  - AP825.1 Partridge
  - AP825.2 Pheasant
  - AP825.3 Pigeon
  - AP825.4 Quail
- AP826 Ratites
  - AP826.1 Emu
  - AP826.2 Ostrich
  - AP826.3 Rhea
- AP827 Peacock

AP830 Poultry/Fowl
- AP831 Chicken
  - AP831.1 Broiler breeder
  - AP831.2 Broiler
  - AP831.3 Hatchery
  - AP831.4 Layer
  - AP831.5 Free range layer
- AP832 Turkey
  - AP832.1 Breeder
  - AP832.2 Meat
- AP833 Duck
- AP834 Goose

AP840 Fur bearing
- AP841 Fox
- AP842 Mink
- AP843 Rabbit
- AP844 Chinchilla
- AP845 Nutria

AP850 Beekeeping and honey production

Table V-VI Livestock codes to be entered in the Livestock field on the data entry form

AP800 Livestock

- AP810 Conventional livestock
  - AP811 Dairy cattle
  - AP812 Beef cattle
    - AP812.1 Veal
  - AP813 Horse
    - AP813.1 Pony
    - AP813.2 Miniature horse
  - AP814 Swine
    - AP814.1 Breeder
    - AP814.2 Farrow
    - AP814.3 Farrow-to-finish
    - AP814.4 Finisher
    - AP814.5 Weaner
  - AP815 Sheep
  - AP816 Goat
  - AP817 Donkey
  - AP818 Mule
- AP820 Specialty livestock
  - AP821 Llama
  - AP822 Alpaca
  - AP823 Musk ox
  - AP824 Game
    - AP824.1 Deer
    - AP824.2 Reindeer
    - AP824.3 Bison
    - AP824.4 Elk
  - AP825 Game bird
    - AP825.1 Partridge
    - AP825.2 Pheasant
    - AP825.3 Pigeon
    - AP825.4 Quail
  - AP826 Ratites
    - AP826.1 Emu
    - AP826.2 Ostrich
    - AP826.3 Rhea
  - AP827 Peacock
- AP830 Poultry/Fowl
  - AP831 Chicken
    - AP831.1 Broiler breeder
    - AP831.2 Broiler
    - AP831.3 Hatchery
    - AP831.4 Layer
    - AP831.5 Free range layer
  - AP832 Turkey
    - AP832.1 Breeder
    - AP832.2 Meat
  - AP833 Duck
  - AP834 Goose
- AP840 Fur-bearing
  - AP841 Fox
  - AP842 Mink
  - AP843 Rabbit
  - AP844 Chinchilla
  - AP845 Nutria
- AP850 Beekeeping and honey production

Appendix – Contacts

Stacy Meech
604 556-3110
Ministry of Agriculture, Food and Fisheries
Resource Management Branch

Or

Karen Thomas
604 556-3104
Ministry of Agriculture, Food and Fisheries
Resource Management Branch

The AgFocus – An Agricultural GIS report and summary brochure can be found on the B.C. Ministry of Agriculture, Food and Fisheries web site, http://www.gov.bc.ca/agf/ under 'Reports & Publications' / Resource Management.

Prepared by:

BC Ministry of Agriculture, Food and Fisheries
Resource Management Branch
1767 Angus Campbell Road
Abbotsford, BC Canada
V3G 2M3